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Little or no impact on educational systems for the deaf have been realized as a result of the study of the deaf within a Piagetian framework. The reasons for this are examined, and it is concluded that some important educational implications do exist. These implications are explored with a particular emphasis placed on the issue of language and the education of the deaf. (Author/SBH)

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PIAGET AND THE DEAF: EDUCATIONAL IMPLICATIONS

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PIAGET AND THE DEAF:

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ABSTRACT

Little or no impact on educational systems for the deaf have been realized as a result of the study of the deaf within a Piagetian framework. The reasons for this are examined and it is concluded that, in fact, some important educational implications do indeed exist. These implications are explored with a particular emphasis placed on the issue of language and the education of the deaf.

PIAGET AND THE DEAF: EDUCATIONAL IMPLICATIONS

The study of Piagetian tasks with the deaf has not had a great impact on the educational systems and curriculums for the deaf. This is so, I believe, because most feel that research in this area has demonstrated essentially that the deaf develop logical operations as the hearing, and do so without the benefit of language. Deficits where they are found, can be attributed to experential deprivation factors in the deaf child's world.

> "deaf children's linguistic deficiency contributes at most indirectly to a slight retardation; otherwise, up to and including the period of concrete operations, intellectual progress is remarkably normal both in gross performance levels and in detailed aspects of intellectual functioning."
>
> (Furth and Younis 1972)

This view has been widely accepted "Studies of deaf children have been made by Cléron (1957) and Furth (1966) among others. Their results concur fundamentally and indicate that deaf children acquire the elementary logical operations with only a slight retardation as compared to normal children." (Sinclair, 1976 , pp 1964). Consequently, educators have felt that there is little to be done educationally as a result of these studies.

Today I propose to critically examine this literature again. Three important issues will be singled out for special scrutiny: the issue of how deaf children perform on Piagetian tasks compared with their hearing counter parts; the issue of what impact, if any, language has on the emergence of concrete operations; and finally, the issue of what exactly 'language'means within the context of ths study of the deaf. I believe that this analysis will highlight a number of important education implications which, have gone undetected in the past.

Let us now turn to the issue of how deaf children perform on concrete operational tasks compared with their hearing counterparts. The best known work in this area has come from Hans Furth and his colleagues (notably James Youniss) at Catholic University. The work is reveiwed in a series of summary articles (1964a, 1971) and in Furth's books (1966,1973).

Furth's well known thesis concerns the lack of importance of language for the development of cognition. Deaf children who are linguistically deficient, spontaneously produce "symbolic instruments" (Furth and Youniss 192,p.13) which compensate for the lack of language. The deaf are therefore capable of Thinking Without Language (Furth 1966). The results of occasional studies which have shown deficits in the performance of the deaf reflect experiential and not linguistic factors. Up to and including the period of concrete operations, the deaf perform normally when compared to the hearing. Overall, Furth and his associates paint a picture of quantitative and qualitative similarity between lingistically competent hearing children and linguistically deficient deaf children. However, close scrutiny of studies in the area indicates that this account may be misleading.

Table 1 contains an up to date summary of concrete operational studies completed to date comparing the performances of deaf and hearing children.

Insert Table 1 about here

TABLE I

Average Lags Observed in Deaf Subjects in Tests of Concrete Operations

Researcher	Type of Study	Deaf Age Lag
Borelli (1951)	Seriation	1/2 year
Oleron and Herren (1961)	Conservation	6 years
Furth (1964b)	Conservation	2 years+
Caouette (1964)	Spatial Relations (six proofs)	
	Seriation and Correspondence Conservation (two proofs)	5 years
Bradshaw (1964)	Transitivity	2 years+
Youniss and Furth (1965)	Transitivity	no difference
Youniss and Furth (1966)	Transitivity	no difference
Piaget (1966)	Conservation	2½ years
Furth (1966)	Conservation	5 years
Youniss (1967)	Seriation	3 years
Springer (1977)	Conservation	3 years
Springer (1978a)	Spatial Perspective	3 years
Springer (1978b)	Class Inclusion	3 years

Average Lag = 2.7 years

Reference to this table indicates that deaf children exhibit lags of an average of 2-7 years in tests of concrete operations. Clearly this data does not support the contention of minimal or occasional differences between groups. In addition, data gathered comparing deaf and hearing groups on tests of formal operations (Furth and Youniss 1969 1970; Furth, Youniss and Ross 1970; Ross and Hoemann 1975; Paris and Springer 1978) has also demonstrated significant lags, thus confirming the continuity of operating retardation observed in the deaf group in the period of concrete operations.

Given this persepctive, a perspective which argues for the existence of significant lags two points become important to highlight. The first concerns the severity of these lags. One can readily see that more severe lags (5-6 year range) are found in the work of Oléron and Caouette than in that of others. Furth (1966) and Piaget (1966) have pointed out some of the methodological problems inherent in Oléron's work. Elsewhere I have discussed (Springer 1977) similar methodological problems in some of Caouette's work. To be sure, the administration of Piagetian proofs to the deaf is not an easy task. The issue of the severity of lags does, however, need further clarification in the future.

A second point concerns the reasons for these lags. A number of hypotheses have been advanced. Caouette and Oléron argue for the importance of linguistic factors. Furth and Youniss argue for the importance of experiential factors. Hoemann argues for the importance of the deaf as under performers in a testing situation. I have argued elsewhere (Springer (1977) for the importance of subject selection factors to this issue. All these factors need to be investigated further.

Regardless of the reasons for the observed lags or the extent of their severity, I believe that there are important educational implications to be drawn from this work. Esentially what we have are deaf children who are chronologically and intellectually ready to construct operatory systems, but who are not. The educational implications then revolve around the

educational exploitation of this situation. Clearly deaf children do not construct their operatory systems, for whatever reason, at the same time as the hearing. Given this and given the traditional academic retardation found in this school population, it seems obvious that educators and psychologists should be attempting to devise special curriculums and enrichment programs which are designed to give the deaf child wider experience from which he can construct his cognitions. What I am trying to say is that deaf children not only need special curriculums in the language arts, but also in the thinking arts. Some of the literature on training Piagetian tasks as well as remedial techniques employed in the area of Learning Disabilities should prove helpful in guiding the construction of special programs. Good suggestions in this area can also be found in the books by Furth and Wachs (1975) and Wolffand Wolff (1974).

Let us now turn to the contentious issue of what impact, if any language has on the emergence of concrete operations. This issue is necessarily complex and one finds many different points of view in the literature. The issue in the broad sense really revolves arcund the definitions of'language'and the term 'impact'. Although Piaget has written that:

> "Le langage est donc une condition nécessaire main non suffisante de la construction des opérations logiques"[1]
>
> (Piaget 1954,p59)

There seems to be some confusion about the interpretation of this issue. Thus Furth, Youniss and Ross (1970) write:

> "whereas language is never a sufficient or necessary condtion of operatory functioning, the evidence from our work with linguistically deficient persons indicates that it may have, at best, an indirect facilitating effect for concrete operations."

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[1] Language is a necessary bet in itself a non-sufficient condtion for the development of logical operations.

and Rosen (1977) writes:

> "Piaget's contention essentially is that language is not necessary or sufficient for intellectual development to occur."

The consensus of opinion seems to be that language plays a relatively minor role, if any, in the emergence of concrete operations in the child.

What evidence do we have from the literature on the deaf which supports this contention? Oléron and Caouette argue that the lags which they have observed reflect the language deficiency of the deaf. Furth and his associates have argued that since there is virtually no difference in the age of emergence of concrete operations between deaf and hearing subjects, language has little effect on the emergence of these operations.

There are two problems with this line of argumentation. The first problem concerns the fact that, as we have seen, the literature does not support the contention of minimal differences between deaf and hearing groups. The second problem is that regardless of the question of severity of lags in the deaf group, there exists little empirical evidence of the relationship between the language deficiency of the deaf and their operatory competence. In other words, any evidence for or against the effect of language on the emergence of logical operations in the deaf has been essentially speculative.

One of the principle reasons for this has been a lack of understanding of what 'language' means within the context of the study of the deaf. Before proceeding any further, I think a discussion of this issue is in order.

Most researchers who have classified the deaf as linguistically deficient have adopted the position that language has meant the aural/spoken/written language (henceforth aural language) of the deaf child's culture. Deaf children have traditionally had difficulty in learning this language. But this point of view is inaccurate in that it completely ignores the deaf child's native language, sign language.

Sign language has been ignored as a significant linguistic factor for two reasons. First, researchers have believed that sign language was not really a language, but simply an idiosyncratic and rudimentary gestural system. Nothing could be more inaccurate! Current linguistic work in the area of sign language [1.] (Stokoe 1960), Stokoe et al 1967), Bellugi et al 1974) strongly supports the notion that sign language is a natural language, a language in which one is capable of expressing the abstract and the nuance of aural language.

Sign language has also been ignored because most educational systems for the deaf have discouraged, and in some cases forbid, the use of sign. However, there is now ample evidence available which strongly suggests that deaf children who receive instruction in sign language, as well as in the traditional oral language methods (a method called Total Communication) perform better in psychological measures than other deaf children (Vernon and Koh,1970; Mindel and Vernon,1971; MacDougall, 1971, Moores et al, 1973). Therefore, when discussing what language means within the context of the study of the deaf, it is important to recognize the importance of both languages, sign language and English.

What happens when one recognizes the importance of both languages within the context of the study of the deaf. In a conservation of number study (Springer 1977), we found some interesting results. Deaf children who were, by and large, not competent in either language conserved number three years younger than their hearing counterparts. The results were consistent with those of previous studies.We also tested a small number of deaf children from deaf families. All these children were competent users of sign language. The profiles of these children were remarkably similar to those of the hearing children, that is, they all conservied number by the age of 7.

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2. In recent years there has been an abundance of work in this area. There is a journal Sign Language Studies completely devoted to this topic.

No doubt these results need formal replication with a substantive signing population (a task with which we are involved now), but it does suggest some intriguing notions. Let us accept for the moment that these deaf children from deaf families differ from other deaf children principaly because of their knowledge of sign language. It is well documented fact that most deaf children who learn aural language do not learn it adequately (Bnvillen and Charrow 1972, Goetzinger and Rousey 1959). Certainly this is true of the deaf child in the early stages of concrete operations. Testimony to this is the fact that one cannot even administer most standard Piagetian tasks to deaf children because of their verbal ineptitudes. Even if these deaf children eventually do learn aural language, and there is certainly not a majority of them who do (Conrad 1977), they do so at a slower rate than hearing children learning aural language, or for that matter, deaf children learning sign language (Schlesinger 1972, Mindel and Vernon 1971).

Therefore it can be suggested that deaf children, if they are to exhibit operatory development at chronologically comparable ages to their hearing counterparts, may need a useful language earlier in their development. This language must be useful in the sense that it can help foster normal communication in the classroom and at home. This language must also be useful in the sense of being involved in organizing (N.B. not causing) and consolidating of the appropriate cognitive structures (Caouette 1964). Because of the inherent problems in the learning of aural language, deaf children are not able to use this language as a useful tool early enough. Because similar problems do not exist with the learning of sign language, deaf children who learn this language have the useful tool they need early enough to bolster their cognitive growth.

This discussion is, of course, highly speculative, but does suggest some important clarifications about the role of language in operatory development. Certainly deaf children develop operatory competence, albeit later than hearing children, and regardless of their longuistic skills.

Therefore, as Piaget has claimed, it is quite clear that language cannot be in itself a necessary condition for the development of operations. However, this does not preclude the notion that language, in the sense of being a useful tool which fosters both communicative interaction with the environment and internal cognitive organizations, can have an impact on the development of logical operations. Thus the role of language, as suggested by studies of the deaf, may be one which is more involved with the acceleration and consolidation of the operation rather than its actual acquistion, a notion which has been suggested before (Borelli 1951). Therefore, our work with the deaf suggests that language does have an impact on the emergence of concrete operations in the deaf.

The educational implications which follow from these results are two-fold. First, it seems obvious that in order to foster normal operatory development (defined by hearing norms), deaf children probably would benefit from more intensive language arts training. This implication is not really striking and is well known to educators of the deaf regardless of Piagetian theory. The second implication is not as well known. Our results suggest that this language training, in order to be successful and useful, should involve the integral use of sign language. We suggest that because of the ease with which deaf children learn sign, it should be the key language involved in educational programs for the deaf. This does not mean that English should not also be taught (i.e. as in Total Communication), but that from the point of view of the developing logical structures of the child, the language used should be able to fit in and be used early enough so as to be useful. For deaf children, sign language fits these criteria, whereas aural language, because of the slowness in which it is acquired by most deaf children, does not. In other words, it may be that deaf children who are prohibited from the use of sign language may be penalized at a cognitive level. Some of our preliminary results suggest that this may be the case, certainly in the early stages of concrete operations.

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